**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | |
|---|---|
| Application No.: | 09/625,769 |
| Filing Date: | July 26, 2000 |
| Applicant: | IIJIMA |
| Group Art Unit: | 2871 |
| Examiner: | ANDREW SCHECHTER |
| Title: | DISPLAY DEVICE AND ELECTRONIC APPARATUS USING THE SAME |
| Attorney Docket: | 9319S-000142 |

Assistant Commissioner for Patents
Washington, D.C. 20231

Attention: Board of Patent Appeals and Interferences

## APPELLANT'S BRIEF (37 C.F.R. 1.192)

This brief (which is filed in triplicate) is in furtherance of the Notice of Appeal, filed in this case on February 28, 2003.



This brief contains these items under the following headings, and in the order set forth below:

I. REAL PARTY IN INTEREST

II. RELATED APPEALS AND INTERFERENCES

III. STATUS OF CLAIMS

IV. STATUS OF AMENDMENTS

V. SUMMARY OF INVENTION

VI. ISSUES

VII. GROUPING OF CLAIMS

VIII. ARGUMENTS

IX. APPENDIX OF CLAIMS INVOLVED IN THE APPEAL

The final page of this brief bears the practitioner's signature.

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Seiko Epson Corporation.

II. RELATED APPEALS AND INTERFERENCES

There are no known appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the present appeal.

III. STATUS OF CLAIMS

The status of the claims in this application is as follows:

a. TOTAL NUMBER OF CLAIMS IN APPLICATION

Claims in the application are 1-24.

b. STATUS OF ALL THE CLAIMS

i. Claims cancelled: 5 and 12-15

ii. Claims withdrawn from consideration but not cancelled: none

iii. Claims pending: 1-4, 6-11, and 16-24

iv. Claims allowed: 1-4 and 6-11

v. Claims rejected: 16-24

c. CLAIMS ON APPEAL

The claims on appeal are 16-24.

IV. STATUS OF AMENDMENTS

There was no amendment filed after the final rejection mailed October 29, 2002.

V. SUMMARY OF INVENTION

The following summary will be given with reference numerals shown in Fig. 5. However, a more general embodiment of the present invention is shown in Fig. 1 and alternate embodiments are shown in Figs. 6 – 9.

As called for in claim 16, a display device 10 is provided and adapted for both reflection type display and transmission type display. The device 10 comprises a liquid crystal panel 20 including a liquid crystal material 26; an illuminating device 70 adapted to illuminate the liquid crystal panel 20 in a transmission type display mode; the illuminating device 70 including a light guiding member 72; a light reflector 80 adapted to reflect an external light impinged upon the liquid crystal panel 20 in a reflection type display mode, the light reflector 80 being positioned behind the illumination device 70 relative to the external light; a light diffuser 30 arranged between the liquid crystal material 26 and the light reflector 80, the light diffuser 30 having forward scattering characteristics, a space between the light diffuser 30 and the light reflector 80 being a certain distance, the light diffuser 30 and the distance satisfying the following relationship:

$$H(\%) \geq -200d + 140(mm)$$

wherein d is the distance between the light diffuser 30 and the light reflector 80, and H is a haze value of the light diffuser 30. Page 29, line 16 – Page 32, line 1. (See also Page 15, line 14 – Page 16, line 17 and Page 23, line 10 – Page 24, line 10 wherein different reference numerals are used).

As called for in Claim 17, the display device 10 further comprises a color filter 27 proximate the liquid crystal panel 20, the color filter 27 being equipped with a plurality of colors 27R, 27G, and 27B. Page 31, lines 3-7.

As called for in Claim 18, the plurality of colors include red 27R, green 27G and blue 27B colors. Page 31, lines 3-7.

As called for in Claim 19, the display device 10 further comprises a polarizer 15 provided between the liquid crystal panel 20 and the light reflector 80, wherein the polarizer 15 substantially transmits a light of a first polarization direction and substantially absorbs a light of a second polarization direction, wherein the first and the second polarization directions are different from each other. Page 29, line 16 – Page 30, line 1, Page 31, lines 15 – 20, and Page 32, line 2 – Page 35, line 15.

As called for in Claim 20, the display device 10 further comprises a light source 71 adapted to introduce light to the light guiding member 72. Page 30, lines 2 – 16.

As called for in Claim 21, the illuminating device 70 is arranged between the light diffuser 30 and the light reflector 80. Page 29, line 16 – Page 30, line 1.

As called for in Claim 22, the display device 10 further comprises: a polarizer 15 provided between the liquid crystal panel 20 and the reflector 80, the polarizer 15 separating light depending on a polarization direction of the light; and a reflection polarizing plate 40 provided between the polarizer 15 and the reflector 80, the reflection polarizing plate 40 separating light depending on a polarization direction of the light; a transmission axis of the polarizer 15 coinciding with a transmission axis of the reflection polarizing plate 80. Page 29, line 16 – Page 31, line 20.

As called for in Claim 23, the display device 10 further comprises a polarizer 12 on a front side of the liquid crystal panel 20. Page 29, line 16 – Page 30, line1.

As called for in Claim 24, the display device further comprises a reflection polarizing plate 40 between the liquid crystal panel 20 and the light reflector 80, wherein the reflection polarizing plate 40 substantially transmits a light of a first polarization direction and substantially reflects a light of a second polarization direction, the first and second polarization directions being different from one another. Page 29, line 16 – Page 31, line 20.

VI. ISSUES

a. Whether claims 16 and 19-24 are unpatentable under 35 U.S.C. 103 over Weber in view of Ouderkirk, and further in view of Broer et al.

b. Whether claims 17 and 18 are unpatentable under 35 U.S.C. 103 over Weber in view of Ouderkirk and Broer et al. as applied to claims 16 and 19-24 above and further in view of the official notice taken by the examiner.

VII. GROUPING OF CLAIMS

a. Claims 16 and 19 – 24 were rejected as a group under 35 U.S.C. 103. Claims 16 and 19 – 24 stand or fall together.

b. Claims 17 and 18 were rejected as a group under 35 U.S.C 103. Claims 17 and 18 stand or fall with base claim 16.

VIII. ARGUMENTS

a. REJECTIONS UNDER 35 U.S.C. 103

Claims 16 and 19-24 stand rejected under 35 U.S.C. 103 as being unpatentable over Weber in view of Ouderkirk, and further in view of Broer et al. Claims 17 and 18 stand rejected under 35 U.S.C. 103 as being unpatentable over Weber in view of Ouderkirk, and further in view of Broer et al. and further in view of the official notice taken by the examiner.

Claim 16 calls for $H(\%) \geq -200d + 140(mm)$ wherein d is the distance between the light diffuser and the light reflector, and H is the haze value of the light diffuser. The present inventor conducted an experiment to reduce the parallax generated when effecting reflection type black and white display in the display device constructed as described above. As shown in Fig. 4, in this experiment, the display device was inclined by 30 degrees, and incident light was applied from a direction inclined by 45 degrees with respect to the display device, and the observer observed the parallax from directly above to obtain the experiment results as shown in Table 1. In Table 1, the haze value H indicates the diffusion ratio (5 to 95%) of the light diffusion plate, and the distance d indicates the distance (mm) between the light diffusion plate and the light reflection plate.

Table 1

| | | Distance d | | | | | |
|---|---|---|---|---|---|---|---|
| | | 0.7 | 0.6 | 0.5 | 0.4 | 0.3 | 0.2 |
| Haze Value | 15 | B | C | C | C | C | C |
| | 24 | A | B | C | C | C | C |
| | 47 | A | A | A | C | C | C |
| | 82 | AA | A | A | A | B | C |
| | 95 | AA | A | A | A | A | C |

In Table 1: AA: Shadow is blurred, and display is clear

A: Shadow is blurred

B: Somewhat conspicuous shadow is seen

C: Shadow is clearly seen

From Table 1, the inventor discovered that the relationship between the haze value H and the distance d can be expressed as follows:

$H \geq -200d + 140$ ... (1)

Claim 16 calls for a display device which is constructed so as to satisfy formula (1). As such, the light diffusion plate can apply the light emitted from the diffusion plate to the light reflection plate in a sufficiently diffused state, thereby reducing the parallax generation.

The present invention is also advantageous when effecting reflection type color display. In a color display, the incident light is colored when it passes the color filter. When the light is reflected by the light reflection plate without being sufficiently diffused by the light diffusion plate, the light re-impinging upon the liquid crystal panel is mixed

with previously colored light as a base color. This results in a display with inconsistent color.

In view of this, by providing a display device which satisfies formula (1), it is possible for the light reaching the light reflection plate (and colored red, green and blue) to be sufficiently diffused, whereby the light reflected from the light reflection plate is white light consisting of uniformly mixed red, green and blue. As a result, it is possible to realize a clear color display free from color inconsistency.

The examiner relies on Weber for teaching most aspects of the invention as claimed in claim 16. The examiner states that there are at least two substrates 150 and 152 between the diffuser 134 and the reflector of Weber and indicates that the light guide itself has some thickness. The examiner then states that d will be greater than 0.7 mm such that the recited haze inequality is automatically satisfied (the examiner asserts that the haze is always greater than or equal to zero or any negative number). The examiner states that claim 16 does not recite the limitation that the diffuser-reflector distance d is between 0.7 and 0.2 mm, inclusive. This limitation is recited in all other allowed claims. Without this limitation, the examiner asserts, any distance d greater than 0.7 mm renders the inequality $H \geq -200d + 140$ (mm) automatically satisfied.

However, the examiner fails to appreciate that none of the prior art teaches or suggests the discovered inequality. That is, none of the prior art teaches or suggests the claimed relationship of haze value to distance. According to MPEP 2143.03 and the cases cited therein, to establish a prima facie case of obviousness, all the claim limitations must be taught or suggested by the prior art reference (or references when combined). No prior art reference teaches or suggests: $H \geq -200d + 140$ (mm). The

particular values of d which satisfy the inequality are not necessary for patentability. Discovering the relationship of haze value to distance is sufficient.

As for claims 17-24, Applicant respectfully submits that these claims are allowable for at least the same reasons as set forth above with respect to base claim 16.

## APPENDIX OF CLAIMS INVOLVED IN THE APPEAL

The text of the claims is as follows:

1. A display device comprising:

a liquid crystal panel including a liquid crystal material;

a light reflector provided behind the liquid crystal panel; and

a light diffuser arranged between the liquid crystal material and the light reflector, the light diffuser having forward scattering characteristics, a space between the light diffuser and the light reflector being a certain distance;

the light diffuser and the distance satisfying the following relationship:

$H(\%) \geq -200d + 140(mm)$

wherein d is the distance between the light diffuser and the light reflector, and H is a haze value of the light diffuser; and

wherein $0.7 \geq d \geq 0.2mm$.

2. A display device according to Claim 1, further comprising a color filter proximate the liquid crystal panel, the color filter being equipped with a plurality of colors.

3. A display device according to Claim 2, wherein the plurality of colors included red, green and blue colors.

4. A display device according to Claim 1, further comprising:

a polarizer provided between the liquid crystal panel and the light reflector,

wherein the polarizer substantially transmits a light of a first polarization direction and substantially absorbs a light of a second polarization direction,

wherein the first and the second polarization directions are different from each other.

6. A display device according to Claim 1, further comprising an illuminating device having light guiding member and a light source capable of introducing light to the light guiding member,

the illuminating device being arranged between the light diffuser and the light reflector.

7. A display device according to Claim 1, further comprising:

a polarizer provided between the liquid crystal panel and the reflector, the polarizer separating light depending on a polarization direction of the light;

a reflection polarizing plate provided between the polarizer and the reflector, the reflection polarizing plate separating light depending on a polarization direction of the light;

a transmission axis of the polarizer coinciding with a transmission axis of the reflection polarizing plate.

8. An electronic apparatus equipped with a display device according to claim 9.

9. A display device according to Claim 1, further comprising a polarizer on a front side of the liquid crystal panel.

10. A display device according to Claim 1, further comprising a reflection polarizing plate between the liquid crystal panel and the light reflector,

wherein the reflection polarizing plate substantially transmits a light of a first polarization direction and substantially reflects a light of a second polarization direction, the first and second polarization directions being different from one another.

11. A display device according to Claim 9, wherein the display device further comprises at least one of a reflective type and a transflective type display device.

16. A display device adapted to provide both reflection type display and transmission type display, the device comprising:

a liquid crystal panel including a liquid crystal material;

an illuminating device adapted to illuminate the liquid crystal panel in a transmission type display mode;

the illuminating device including a light guiding member;

a light reflector adapted to reflect an external light impinged upon the liquid crystal panel in a reflection type display mode, the light reflector being positioned behind the illumination device relative to the external light;

a light diffuser arranged between the liquid crystal material and the light reflector, the light diffuser having forward scattering characteristics, a space between the light

diffuser and the light reflector being a certain distance, the light diffuser and the distance satisfying the following relationship:

$$H(\%) \geq -200d + 140(mm)$$

wherein d is the distance between the light diffuser and the light reflector, and H is a haze value of the light diffuser.

17. A display device according to Claim 16, further comprising a color filter proximate the liquid crystal panel, the color filter being equipped with a plurality of colors.

18. A display device according to Claim 17, wherein the plurality of colors include red, green and blue colors.

19. A display device according to Claim 16, further comprising:

a polarizer provided between the liquid crystal panel and the light reflector,

wherein the polarizer substantially transmits a light of a first polarization direction and substantially absorbs a light of a second polarization direction,

wherein the first and the second polarization directions are different from each other.

20. A display device according to Claim 16, further comprising a light source adapted to introduce light to the light guiding member.

21. A display device according to Claim 16, wherein the illuminating device is arranged between the light diffuser and the light reflector.

22. A display device according to Claim 16, further comprising:

a polarizer provided between the liquid crystal panel and the reflector, the polarizer separating light depending on a polarization direction of the light; and

a reflection polarizing plate provided between the polarizer and the reflector, the reflection polarizing plate separating light depending on a polarization direction of the light;

a transmission axis of the polarizer coinciding with a transmission axis of the reflection polarizing plate.

23. A display device according to Claim 16, further comprising a polarizer on a front side of the liquid crystal panel.

24. A display device according to Claim 16, further comprising a reflection polarizing plate between the liquid crystal panel and the light reflector,

wherein the reflection polarizing plate substantially transmits a light of a first polarization direction and substantially reflects a light of a second polarization direction, the first and second polarization directions being different from one another.

Respectfully submitted,

Dated: May 28, 2003

By: _____
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SAF/2871

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HDP/SB/21 based on PTO/SB/21 (08-00)

# TRANSMITTAL FORM

*(to be used for all correspondence after initial filing)*

| | |
|---|---|
| **Application Number** | 09/625,769 |
| **Filing Date** | July 26, 2000 |
| **First Named Inventor** | IIJIMA |
| Group Art Unit | 2871 |
| Examiner Name | Andrew Schecter |
| Attorney Docket Number | 9319S-000142 |

Total Number of Pages in This Submission

ENCLOSURES *(check all that apply)*

- ☒ Fee Transmittal Form
  - ☒ Fee Attached
- ☐ Amendment / Response
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Response to Missing Parts/ Incomplete Application
  - ☐ Response to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Assignment Papers *(for an Application)*
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) ____
- ☐ After Allowance Communication to Group
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☒ Appeal Communication to Group *(Appeal Notice, Brief, Reply Brief)*
- ☐ Proprietary Information
- ☐ Status Letter
- ☒ Other Enclosure(s) *(please identify below)*:

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Remarks: **The Commissioner is hereby authorized to charge any additional fees that may be required under 37 CFR 1.16 or 1.17 to Deposit Account No. 08-0750.**

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## SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

| | | | |
|---|---|---|---|
| Firm *or* Individual name | Harness, Dickey & Pierce, P.L.C. | Attorney Name<br>G. Gregory Schivley<br>Bryant E. Wade | Reg. No.<br>27,382<br>40,344 |
| Signature | | | |
| Date | May 28, 2003 | | |

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| Typed or printed name | G. Gregory Schivley Bryant E. Wade | | |
| Signature | | Date | May 28, 2003 |

PTO/SB/17 (01-03)
Approved for use through 10/31/2002. OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE



# FEE TRANSMITTAL for FY 2003

*Patent fees are subject to annual revision.*

☐ Applicant claims small entity status. See 37 CFR 1.27

**TOTAL AMOUNT OF PAYMENT** ($) 330

| *Complete if Known* | |
|---|---|
| Application Number | 09/625,769 |
| Filing Date | 7/26/2000 |
| First Named Inventor | IIJIMA |
| Examiner Name | Andrew Schechter |
| Group / Art Unit | 2871 |
| Attorney Docket No. | 9319S-000142 |

## METHOD OF PAYMENT (check all that apply)

☒ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☐ Deposit Account:

Deposit Account Number: 08-0750

Deposit Account Name: Harness, Dickey & Pierce, P.L.C.

**The Commissioner is authorized to:** *(check all that apply)*
☐ Charge fee(s) indicated below ☒ Credit any overpayments
☒ Charge any additional fee(s) during the pendency of this application
☐ Charge fee(s) indicated below, **except for the filing fee** to the above-identified deposit account.

## FEE CALCULATION

### 1. BASIC FILING FEE

| Large Entity Fee Code | Large Entity Fee ($) | Small Entity Fee Code | Small Entity Fee ($) | Fee Description | Fee Paid |
|---|---|---|---|---|---|
| 1001 | 750 | 2001 | 375 | Utility filing fee | |
| 1002 | 330 | 2002 | 165 | Design filing fee | |
| 1003 | 520 | 2003 | 260 | Plant filing fee | |
| 1004 | 750 | 2004 | 375 | Reissue filing fee | |
| 1005 | 160 | 2005 | 80 | Provisional filling fee | |

SUBTOTAL (1) ($) 0

### 2. EXTRA CLAIM FEES

| | | | Extra Claims | | Fee from below | | Fee Paid |
|---|---|---|---|---|---|---|---|
| Total Claims | | -20 ** = | 0 | X | | = | 0 |
| Independent Claims | | -3 ** = | 0 | X | | = | 0 |
| Multiple Dependent | | | | X | | = | 0 |

| Large Entity Fee Code | Large Entity Fee ($) | Small Entity Fee Code | Small Entity Fee ($) | Fee Description |
|---|---|---|---|---|
| 1202 | 18 | 2202 | 9 | Claims in excess of 20 |
| 1201 | 84 | 2201 | 42 | Independent claims in excess of 3 |
| 1203 | 280 | 2203 | 140 | Multiple dependent claim, if not paid |
| 1204 | 84 | 2204 | 42 | ** Reissue independent claims over original patent |
| 1205 | 18 | 2205 | 9 | ** Reissue claims in excess of 20 and over original patent |

SUBTOTAL (2) ($) 0

**or number previously paid, if greater; For Reissues, see above

## FEE CALCULATION (continued)

### 3. ADDITIONAL FEES

| Large Entity Fee Code | Large Entity Fee ($) | Small Entity Fee Code | Small Entity Fee ($) | Fee Description | Fee Paid |
|---|---|---|---|---|---|
| 1051 | 130 | 2051 | 65 | Surcharge - late filing fee or oath | |
| 1052 | 50 | 2052 | 25 | Surcharge - late provisional filing fee or cover sheet. | |
| 1053 | 130 | 1053 | 130 | Non-English specification | |
| 1812 | 2,520 | 1812 | 2,520 | For filing a request for reexamination | |
| 1804 | 920* | 1804 | 920* | Requesting publication of SIR prior to Examiner action | |
| 1805 | 1,840* | 1805 | 1,840* | Requesting publication of SIR after Examiner action | |
| 1251 | 110 | 2251 | 55 | Extension for reply within first month | |
| 1252 | 410 | 2252 | 205 | Extension for reply within second month | |
| 1253 | 930 | 2253 | 465 | Extension for reply within third month | |
| 1254 | 1,450 | 2254 | 725 | Extension for reply within fourth month | |
| 1255 | 1,970 | 2255 | 985 | Extension for reply within fifth month | |
| 1401 | 320 | 2401 | 160 | Notice of Appeal | |
| 1402 | 320 | 2402 | 160 | Filing a brief in support of an appeal | 320 |
| 1403 | 280 | 2403 | 140 | Request for oral hearing | |
| 1451 | 1,510 | 1451 | 1,510 | Petition to institute a public use proceeding | |
| 1452 | 110 | 2452 | 55 | Petition to revive – unavoidable | |
| 1453 | 1,300 | 2453 | 650 | Petition to revive – unintentional | |
| 1501 | 1,300 | 2501 | 650 | Utility issue fee (or reissue) | |
| 1502 | 470 | 2502 | 235 | Design issue fee | |
| 1503 | 630 | 2503 | 315 | Plant issue fee | |
| 1460 | 130 | 1460 | 130 | Petitions to the Commissioner | |
| 1807 | 50 | 1807 | 50 | Processing fee under 37 CFR 1.17 (q) | |
| 1806 | 180 | 1806 | 180 | Submission of Information Disclosure Stmt | |
| 8021 | 40 | 8021 | 40 | Recording each patent assignment per property (times number of properties) | |
| 1809 | 750 | 2809 | 375 | Filing a submission after final rejection (37 CFR § 1.129(a)) | |
| 1810 | 750 | 2810 | 375 | For each additional invention to be examined (37 CFR § 1.129(b)) | |
| 1801 | 750 | 2801 | 375 | Request for Continued Examination (RCE) | |
| 1802 | 900 | 1802 | 900 | Request for expedited examination of a design application | |

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 330



| SUBMITTED BY | | | | | Complete *(if applicable)* |
|---|---|---|---|---|---|
| *Name (Print/Type)* | G. Gregory Schivley<br>Bryant E. Wade | *Registration No. (Attorney/Agent)* | 27,382<br>40,344 | *Telephone* | (248) 641-1600 |
| *Signature* | | | | *Date* | May 28, 2003 |

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